AMENDMENTS TO THE CLAIMS

The following is a complete, marked-up listing of revised claims with a status identifier in parentheses, underlined text indicating insertions, and strikethrough and/or double-bracketed text indicating deletions.

LISTING OF CLAIMS

1. (Original) A method for reactor simulation, comprising:

receiving user input to modify one or more design inputs used in creating a response surface, the response surface defining relationships between the design inputs and operational outputs of at least one or more aspects of a core design; and

generating a reactor simulation based on the response surface for the core design and the modified design input.

2. (Original) The method of claim 1, further comprising: accessing the response surface for the core design from a database.

3. (Original) The method of claim 1, wherein the design inputs include at least one of control blades positions over time, bundle types of fresh fuel, loading pattern of exposed fuel, and water flow through the reactor core.

4. (Original) The method of claim 1, wherein the operational outputs include at least one of critical power ratio (CPR), shutdown margin (SDM), maximum average planar linear heat generation rate (MAPLHGR), maximum fraction of linear power density (MFLPD), hot excess reactivity, radial and axial power peaking, peak fuel rod and bundle exposure, Uranium utilization

as measured by reactor energy output produced (in mega-watt-days) per kilogram of Uranium-235 loaded.

5. (Original) The method of claim 1, wherein the generating step generates the reactor simulation in real time.

6. (Original) The method of claim 1, wherein the response surface includes information defining a plurality of predictors, each predictor predicting one of the operational outputs based on one of the design inputs.

7. (Original) The method of claim 6, wherein the generating step uses one or more predictors associated with the modified design input to generate new operational outputs.

8. (Currently Amended) The method of claim 6, wherein each predictor is one of a second order polynomial and a linear function.

9. (Original) The method of claim 1, further comprising: providing feedback to the user on the generated reactor simulation.

10. (Original) The method of claim 9, wherein the providing step provides an old objective function value for the core design prior to modification of the design input and a new objective function value for the core design after modification of the design input.

11. (Original) The method of claim 10, wherein a same objective function is used to

determine the old and new objective function values.

12. (Original) The method of claim 11, wherein the same objective function is the objective function used to create the core design.

13. (Original) The method of claim 11, wherein the same objective function is a different objective function than an objective function used to create the core design.

14. (Currently Amended) The method of claim 10, wherein different objective functions are used to determine~~d~~ the old and new object function values.

15. (Original) The method of claim 9, wherein the providing step provides a worst case value for at least one of the operational outputs.

16. (Original) The method of claim 15, wherein the providing step provides the worst case value for one or more operational outputs selected by the user.

17. (Original) The method of claim 1, wherein the reactor being simulated is a boiling water reactor.

18. (Original) The method of claim 1, wherein the reactor being simulated is a pressure water reactor.

19. (Original) A method for obtaining a reactor simulation, comprising:

identifying a response surface, the response surface defining relationships between design input and operational outputs of at least one or more aspects of a core design;

inputting a modification to a design input of the core design;

receiving one or more reactor simulation results for a reactor simulation of the core design with the changed designed input.

20. (Original) The method of claim 19, wherein the design inputs include at least one of control blades positions over time, bundle types of fresh fuel, loading pattern of exposed fuel, and water flow through the reactor core.

21. (Original) The method of claim 19, wherein the operational outputs include at least one of critical power ratio (CPR), shutdown margin (SDM), maximum average planar linear heat generation rate (MAPLHGR), maximum fraction of linear power density (MFLPD), Hot excess reactivity, radial and axial power peaking, peak fuel rod and bundle exposure, Uranium utilization as measured by reactor energy output produced (in mega-watt-days) per kilogram of Uranium-235 loaded.

22. (Original) The method of claim 19, wherein the receiving step receives the reactor simulation results in real time.

23. (Currently Amended) The method of claim 19, wherein the response surface includes information defining a plurality of predictors, each predictor predicting one of the operational outputs based on one of the design inputs.

24. (Original) The method of claim 23, wherein each predictor is one of a second order polynomial and a linear function.

25. (Original) The method of claim 19, wherein the receiving step receives an old objection function value for the core design prior to modification of the design input and a new objective function value for the core design after modification of the design input.

26. (Original) The method of claim 25, wherein a same objective function is used to determine the old and new objective function values.

27. (Original) The method of claim 26, wherein the same objective function is the objective function used to create the core design.

28. (Original) The method of claim 26, wherein the same objective function is a different objective function than an objective function used to create the core design.

29. (Original) The method of claim 25, wherein different objective functions are used to determined the old and new object function values.

30. (Original) The method of claim 19, wherein the receiving step receives a worst case value for at least one of the operational outputs.

31. (Original) The method of claim 30, wherein the providing step provides the worst case

value for one or more operational outputs selected by the user.

32. (Original) The method of claim 19, wherein the reactor being simulated is a boiling water reactor.

33. (Original) The method of claim 19, wherein the reactor being simulated is a pressure water reactor.

34. (Original) A method of operating a nuclear reactor, comprising:

operating a nuclear reactor using a reactor simulation generated based on a response surface for a core design and a modified design input received from a user, the modified design input being a modification of a design input used in creating the response surface, the response surface defining relationships between the design inputs and operational outputs of at least one or more aspects of the core design.

35. (New) The method of claim 34, wherein the operating a nuclear reactor includes moving and placing nuclear components based on the output of a reactor simulation involving a response surface.